Idaho State Department of Agriculture
Division of Agricultural Resources

Ground Water Quality of Southern Clearwater Plateau Volcanic Aquifer

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Introduction

The Idaho State Department of Agriculture (ISDA) developed the Agricultural Regional Ground Water Quality Monitoring Program to characterize degradation of ground water quality from contaminants leaching from agricultural sources. ISDA currently is conducting twelve regional monitoring projects (Figure 1). The objectives of the program are to: characterize nitrate and pesticides in ground water, determine if legal pesticide use contributes to aquifer degradation, relate data to agricultural land use practices, and provide data for Best Management Practices (BMPs) and/or regulatory implementation and evaluation.

The ISDA Southern Clearwater Plateau Volcanic Aquifer regional monitoring project began in 2001 as a result of previous monitoring by the Idaho Department of Water Resources, and Idaho Department of Environmental Quality. Historically, a number of wells in Lewis and Nez Perce Counties were elevated for nitrate (Crockett 1995; Bentz 1998).

Methods

To establish this project, ISDA statistically assessed IDWR Statewide Program nitrate, chloride, and atrazine monitoring data. ISDA statistically determined that sampling 72 randomly selected domestic wells in the Nez Perce, Lewis, and Idaho Counties would provide regional nitrate and pesticide results at a high confidence level. All sampling was conducted after a Quality Assurance Project Plan (QAPP) was established. Permission was gained from the land owners prior to sampling.

Nutrients, common ions, and pesticides were evaluated during the first year (2001) of testing. Samples collected were sent to the University of Idaho Analytical Sciences Laboratory (UIASL) in Moscow, Idaho. The UIASL conducted tests for nitrate, nitrite, ammonia, ortho phosphorus, chloride, sulphate, bromide, fluoride, and pesticides utilizing EPA Methods 507, 508, 515.1, and 531.1. Duplicates, splits, and Matrix Spikes/Matrix Spike Duplicates were collected and submitted as a part of the QAPP.

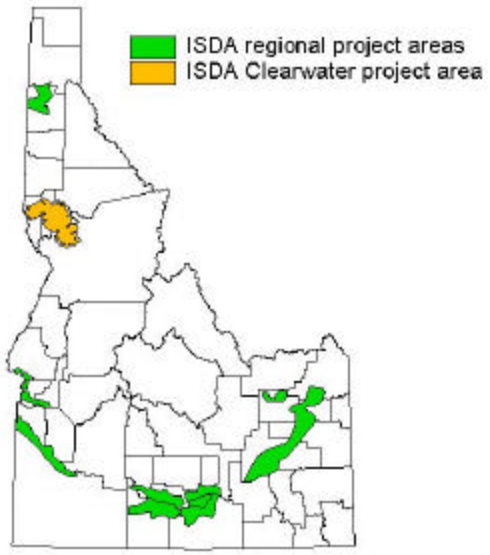

Figure 1. Location of Southern Clearwater Plateau Volcanic Aquifer regional project and other ISDA regional projects.

Results

Sampling results for the first year of testing indicate moderate nitrate and minimal pesticide impacts to the broader aquifer. Results are summarized and presented in the following sections.

Nitrate

Results of ground water sampling in the project area suggested a mean and median nitrate value of 3.22 and 1.45 milligram per liter (mg/L), respectively with a high value of 29 mg/L (Table 1). Eight percent (six wells) of 72 wells sampled were between five and 10 mg/L. Eight percent were greater than 10 mg/L. There were a greater number of detections over 10 mg/L in Idaho County near Ferdinand and north of Grangeville than in Lewis and Nez Perce Counties (Figure 2). There was one nitrate detection greater than 10 mg/L in Nez Perce County south of Lewiston and none in Lewis County (Figure 2).

Table 1. ISDA nitrate results for the Southern Clearwater Plateau regional project from seventy-two wells sampled in 2001.

Detection Range General Statistics	Number and % of Detections
Non-detect (ND)	13 (18%)
ND—2 mg/L	27 (38%)
2—5 mg/L	20 (28%)
5—10 mg/L	6 (8%)
> 10 mg/L	6 (8%)
Mean	3.22 mg/L
Median	1.45 mg/L
High Value	29 mg/L

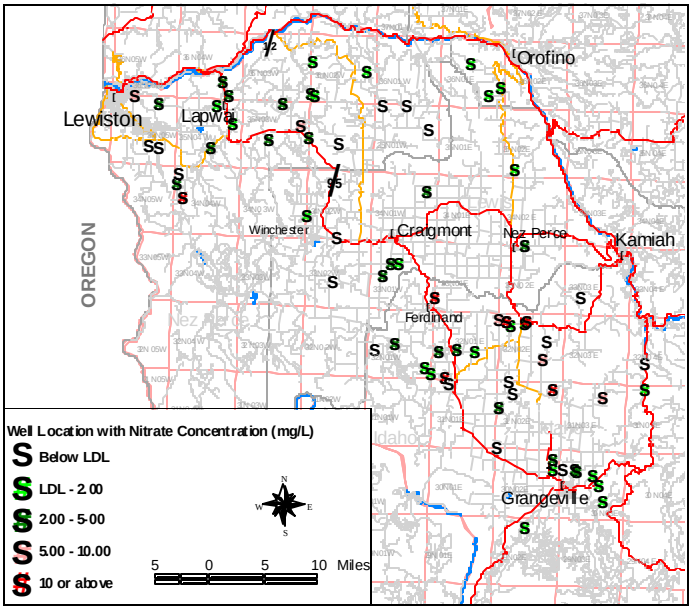

Figure 2. Location of wells sampled by ISDA in 2001

Pesticides

Six wells out of 72 had positive pesticide detections (Figure 3). A well south of Lewiston in Nez Perce County had detections for atrazine (1.50 micrograms per liter (µg/L)), atrazine desethyl (1.80 µg/L), and bromacil (0.11 µg/L) (Figure 3). One well northwest of Grangeville in Idaho County had a detection for triallate (0.56 µg/L) (Figure 3). The herbicide dacthal was found in two wells. All individual pesticide detections were below any public drinking water health standard as set by the Environmental Protection Agency (EPA) and the state of Idaho.

However, when adding the atrazine and atrazine desethyl detections together, the resulting concentration is higher than the 3.0 µg/L atrazine Maximum Contaminant Level (MCL) as set by the EPA and the state of Idaho. The tri - allate detection (0.56 µg/L) is greater than the EPA Food Quality Protection Act Drinking Water Level of Concern value of 0.45 µg/L.

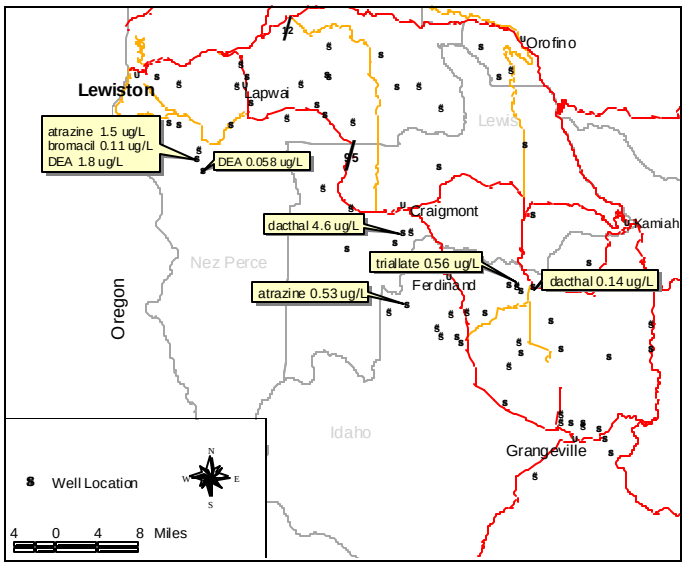

Figure 3. Location of wells sampled by ISDA in 2001 with two wells containing detections for pesticides.

Conclusions

Ground water monitoring results within the volcanic aquifer of the project area indicate that there are impacts occurring from nitrates and pesticides. Nitrate contamination of ground water is of concern due to the number of nitrate detections greater than 5 mg/L and over the MCL of 10 mg/L. There were very few pesticide detections. However, there may be concerns related to certain herbicides due to the isolated detections found.

Recommendations

ISDA recommends continued monitoring and evaluation in the project area. ISDA also recommends the initiation of a locally led agricultural education, and nutrient management planning effort, and the implementation of agricultural Best Management Practices (BMP). ISDA will work with the Idaho Soil Conservation Commission, Natural Resources Conservation Service, and local Soil Conservation Districts to implement planning and projects. ISDA will address pesticide issues for the area.

References

Bentz, B. 1998. A Reconnaissance of Nitrite/Nitrate in Camas Prairie Ground Water Volume I, Lewis and Idaho County, Idaho. Idaho Department of Environmental Quality. Lewiston Regional Office. 42 pp.

Crockett, J.K. 1995. Idaho Statewide Ground Water Quality Monitoring Program – Summary of Results, 1991 – 1993. Idaho Department of Water Resources. Water Information Bulletin No. 50 Part 2. 67 pp.